STANDARD FORCE MAIN NOTES

PART 1 - GENERAL

1. ALL FORCE MAINS SHALL BE DUCTILE IRON PIPE.

2. CONTRACTOR SHALL NOTIFY INSPECTOR AT LEAST 24 HOURS PRIOR TO BEGINNING ANY WORK ON DWR FACILITIES.

PART 2 - MATERIALS

1. DUCTILE IRON PIPE AND APPURTENANCES

A. PIPE COATING AND LINING

1) ALL DUCTILE IRON PIPE AND FITTINGS BURIED UNDERGROUND OR SUBMERGED SHALL HAVE A STANDARD BITUMINOUS OUTSIDE COATING CONFORMING TO ANSI A21.6 OR A21.51. ALL EXPOSED DUCTILE IRON PIPE AND FITTINGS SHALL HAVE AN OUTSIDE COATING OF UNIVERSAL PRIMER. UNLESS NOTED OTHERWISE, ALL DUCTILE IRON PIPE USED FOR FORCE MAINS SHALL HAVE CEMENT MORTAR LINING OF STANDARD THICKNESS IN ACCORDANCE WITH ANSI A21.4. CEMENT MORTAR LINING FOR DUCTILE IRON FITTINGS SHALL BE DOUBLE THE STANDARD THICKNESS UNDER ANSI A21.4.

2) WHERE SHOWN ON THE PLANS DUCTILE IRON PIPE AND FITTINGS SHALL BE WRAPPED ENTIRELY IN PREFABRICATED, 8-MIL POLYETHYLENE SLEEVES, WHICH SHALL BE SLIPPED OVER THE PIPE DURING INSTALLATION, OVERLAPPED WHERE NECESSARY, AND SECURED WITH POLYETHYLENE TAPE TO COMPLETELY PREVENT THE ENTRANCE OF FOREIGN MATTER. SUCH ENCASEMENT SHALL BE CARRIED OUT IN ACCORDANCE WITH ANSI/AWWA SPECIFICATION C105/A21.5-82, 'AMERICAN NATIONAL STANDARD FOR POLYETHYLENE ENCASEMENT FOR DUCTILE IRON PIPING AND WATER AND OTHER LIQUIDS'. WHEN POLYETHYLENE ENCASEMENT IS REQUIRED IT SHALL BE PAID FOR AS AN EXTRA.

3) PAINT ALL STEEL SLEEVES, TAPPING SLEEVES, RODS, NUTS AND WASHERS, AND COUPLINGS WITH ROSTER LABORATORIES, INC., ROSKOTE MASTIC NO. A-939, OR KOPPERS COMPANY, INC. BITUMASTIC SUPERSERVICE BLACK OR APPROVED EQUIVALENT.

B. PUSH-ON PIPE AND FITTINGS

1) ALL PUSH-ON DUCTILE IRON PIPE SHALL BE MANUFACTURED IN ACCORDANCE WITH AND MEETING THE LATEST REQUIREMENTS OF AWWA C151/A21.51.

2) ALL PUSH-ON FITTINGS WITH BODY THICKNESS AND RADII OF CURVATURE SHALL CONFORM TO THE LATEST AWWA C110 OR AWWA C153/A21.53. DESIGN OF FITTINGS, WHETHER LONG OR SHORT PATTERN, SHALL BE AS INDICATED, NOTED OR DIRECTED ON THE PLANS.

3) SUFFICIENT LUBRICANT SHALL BE FURNISHED WITH EACH ORDER OF PIPE TO PROVIDE A THIN COATING ON EACH SPIGOT END. LUBRICANT SHALL HAVE NO DELETERIOUS EFFECT ON THE RUBBER GASKET. LUBRICANT SHALL BE OF SUCH CONSISTENCY THAT IT CAN BE EASILY APPLIED TO THE PIPE IN EITHER HOT OR COLD WEATHER AND SHALL ADHERE TO EITHER WET OR DRY PIPE. ONLY LUBRICANT FURNISHED WITH THE PIPE BY THE PIPE MANUFACTURER SHALL BE USED.

C. FLANGED PIPE AND FITTINGS

1) ALL FLANGED DUCTILE IRON PIPE BARRELS SHALL BE MANUFACTURED IN ACCORDANCE WITH AND MEETING THE LATEST REQUIREMENTS OF AWWA C151/A21.51.

2) PROVIDE ALL FLANGED CAST IRON FITTINGS MANUFACTURED IN ACCORDANCE WITH THE REQUIREMENTS OF AWWA C110, 125 POUND STANDARD, NOTED OR DIRECTED IN THE LATEST EDITION OF 'HANDBOOK OF DUCTILE IRON, DUCTILE IRON PIPE RESEARCH ASSOCIATION'. PROVIDE DESIGN OF FLANGED DUCTILE IRON FITTINGS AS INDICATED OR NOTED ON THE PLANS AS DIRECTED. IN GENERAL, USE FLANGED FITTINGS OR AWWA PATTERN WITH LONG RADIUS ELBOWS EXCEPT WHERE SPACE LIMITATIONS PROHIBIT USE OF SAME.

3) CONFORM SPECIAL FLANGED FITTINGS TO DIMENSIONS AND DETAILS INDICATED ON THE PLANS, NOTED OR DIRECTED. FLANGED FITTINGS, INCLUDING WALL CASTINGS, SHALL BE CLASS 250 FITTINGS.

4) PAINT ALL BOLTS AND NUTS THAT WILL BE <u>UNDERGROUND</u> WITH TWO HEAVY COATS OF KOPPERS BITUMASTIC NO. 50, OR APPROVED EQUAL.

D. MECHANICAL JOINT PIPE AND FITTINGS

1) PROVIDE ALL MECHANICAL JOINT DUCTILE IRON PIPE BARRELS MANUFACTURED IN ACCORDANCE WITH THE LATEST REQUIREMENTS OF AWWA STANDARD C151/A21.51.

2) MAKE THE MECHANICAL JOINT HEREIN SPECIFIED FOR MECHANICAL JOINT DUCTILE IRON PIPE AND FITTINGS MEET THE REQUIREMENTS OF AWWA STANDARD C111/A21.11.

3) PROVIDE ALL MECHANICAL JOINT FITTINGS WITH BODY THICKNESS, LAYING LENGTH AND RADII OF CURVATURE CONFORMING TO THE LATEST AWWA STANDARD C110/A21.10 AND JOINTS IN ACCORDANCE WITH SECTION 11-2.3 OF THE LATEST AWWA STANDARD C111/A21.11, MINIMUM CLASS 250 DUCTILE IRON IN ALL SIZES. MAKE DESIGN OF FITTINGS, WHETHER LONG OR SHORT PATTERN, AS INDICATED, NOTED OR DIRECTED ON THE PLANS. MAKE SPECIAL FITTINGS CONFORM TO DIMENSIONS AND DETAILS AS DIRECTED, INDICATED OR NOTED ON THE PLANS.

E. FLANGES

1) FLANGED DUCTILE IRON PIPE TWELVE INCHES OR LESS IN LENGTH SHALL HAVE FLANGES CAST SOLIDLY TO THE PIPE BARREL. FLANGES ON DUCTILE IRON PIPE LONGER THAN TWELVE INCHES IN LENGTH SHALL BE SCREW ON TYPE.

2) FACE AND DRILL PIPE WITH SCREW TYPE FLANGES ASSEMBLED AT THE POINT OF MANUFACTURE UNLESS OTHERWISE APPROVED BY THE OWNER.

3) FURNISH ALL CAST IRON BLIND FLANGES AND COMPANION FLANGES IN ACCORDANCE WITH THE LATEST REQUIREMENTS OF ANSI STANDARD A21.10. FURNISH CAST IRON REGULAR OR ECCENTRIC REDUCING FLANGES TO THE THICKNESS OF AND DRILLED TO THE TEMPLATE OF THE REGULAR COMPANION FLANGE OF CORRESPONDING OUTSIDE DIAMETER.

F. RESTRAINED JOINT PIPE AND FITTINGS

1) PROVIDE ALL RESTRAINED JOINT PUSH-ON DUCTILE IRON PIPE BARRELS MANUFACTURED IN ACCORDANCE WITH THE LATEST REQUIREMENTS OF THE AWWA STANDARD C151/A21.51.

2) PROVIDE RESTRAINED JOINT PUSH-ON PIPE AND FITTINGS, AMERICAN CAST IRON PIPE 'LOCK-RING', U. S. PIPE TR-FLEX OR EQUAL.

3) PROVIDE RESTRAINED JOINT FITTINGS WITH BODY THICKNESS, LAYING LENGTH AND RADII OF CURVATURE CONFORMING TO THE LATEST AWWA STANDARD C110/A21.10 AND JOINTS IN ACCORDANCE WITH SECTION 11-2.3 OF THE LATEST AWWA STANDARD C111/A21.11, MINIMUM CLASS 250 DUCTILE IRON IN ALL SIZES. MAKE DESIGN OF FITTINGS, WHETHER LONG OR SHORT PATTERN, AS INDICATED, NOTED OR DIRECTED ON THE PLANS. MAKE SPECIAL FITTINGS CONFORM TO DIMENSIONS AND DETAILS AS DIRECTED, INDICATED OR NOTED ON THE PLANS.

G. WALL THICKNESS

DUCTILE IRON PIPE SHALL HAVE THE FOLLOWING MINIMUM WALL THICKNESS:

1) PUSH-ON AND MECHANICAL JOINT PIPE

PIPE DIAMETER IN (MM)	PIPE CLASS	MINIMUM WALL THICKNESS IN (MM)
4 (100)	51	0.26 (6.6)
6 (150)	50	0.25 (6.4)
8 (200)	50	0.27 (6.9)
10 (250)	50	0.29 (7.4)
12 (300)	50	0.31 (7.9)
16 (400)	50	0.34 (8.6)

WHERE 8" PIPE PROVIDED IS 'PRESSURE CLASS' RATHER THAN 'THICKNESS CLASS', 350 PSI CLASS SHALL BE SUBSTITUTED FOR CLASS 50 DUCTILE IRON PIPE, UNLESS OTHERWISE SPECIFIED IN THE CONTRACT DOCUMENTS OR PROJECT DESIGN. PIPES GREATER THAN 12" SHALL BE PROVIDED WITH A WALL THICKNESS GREATER THAN OR EQUAL TO THE STANDARD DESIGN MINIMUM WALL THICKNESS OF CLASS 50 DUCTILE IRON PIPE, UNLESS OTHERWISE SPECIFIED IN THE CONTRACT DOCUMENTS OR PROJECT DESIGN.

2) RESTRAINED JOINT PIPE SHALL HAVE THE MINIMUM WALL THICKNESS EQUAL TO THE ADJOINING PIPE SECTIONS.

3) DUCTILE IRON PIPE WITH FLANGED JOINTS SHALL BE MINIMUM CLASS 53.

H. MARKING

1) ALL DUCTILE IRON FITTINGS SHALL BE MARKED IN ACCORDANCE WITH AWWA STANDARD C110/A21.10, SECTION 10-9, 'MARKING OF FITTINGS'. ALL DUCTILE IRON PIPE SHALL BE MARKED IN ACCORDANCE WITH REQUIREMENTS OF SECTION 51-10, 'MARKING PIPE', OF AWWA STANDARD C151/A21.51. ALSO INCLUDE IN MARKING THE MANUFACTURER'S INITIALS, YEAR CAST, AND CLASS LETTER OR NUMBER. PAINT MARK NUMBER AND WEIGHT CONSPICUOUSLY ON EACH PIECE.

2) FURNISH THE OWNER WITH LISTS OF ALL PIECES OF PIPE AND FITTINGS IN EACH SHIPMENT RECEIVED. ON LISTS INDICATE THE SERIAL OR MARK NUMBER, WEIGHT, CLASS, SIZE AND DESCRIPTION OF EACH TYPICAL PIECE RECEIVED.

PART 3 - EXECUTION

1. THE CONTRACTOR SHALL NOTIFY EACH INDIVIDUAL UTILITY OWNER OF HIS PLAN OF OPERATION IN THE AREA OF WORK AND PRIOR TO COMMENCING WORK, CONTACT THE UTILITY LOCATING SERVICE AND REQUEST THEM TO PROPERLY LOCATE THEIR RESPECTIVE UTILITY ON THE GROUND. THIS NOTIFICATION SHOULD BE GIVEN AT LEAST THREE BUSINESS DAYS PRIOR TO COMMENCEMENT OF WORK.

2. THE CONTRACTOR SHALL NOTIFY THE UTILITY PROTECTION AGENCY 72 HOURS PRIOR TO COMMENCEMENT OF WORK.

3. TRENCH EXCAVATION

A. EXCAVATE THE TRENCH TO PROVIDE A MAXIMUM WIDTH OF 12 IN (300 MM) ON EACH SIDE OF THE OUTSIDE DIAMETER OF THE PIPE BARREL UP TO 1 FT (300 MM) ABOVE THE TOP OF THE PIPE, UNLESS OTHERWISE SPECIFIED. SIDE SLOPING TO THE TRENCH BOTTOM WILL NOT BE PERMITTED.

B. SHOULD TRENCHES BE EXCAVATED WITH MORE THAN THE SPECIFIED MAXIMUM WIDTHS, THE ENGINEER MAY REQUIRE THE CONTRACTOR TO FURNISH ADDITIONAL BEDDING, CONCRETE CRADLES, OR CONCRETE ENCASEMENT FOR THE PIPE AT THE CONTRACTOR'S EXPENSE.

C. SHAPE THE TRENCH BOTTOM TO FIT THE PIPE.

D. CUT RECESSES IN THE TRENCH BOTTOM TO ACCOMMODATE THE BELLS, EXCEPT ON HOUSE CONNECTIONS.

E. IF ANY PART OF A SEWER LINE IS TO BE PLACED IN OR UNDER A NEW EMBANKMENT, FINISH THE EMBANKMENT TO AT LEAST A 2 FT (600 MM) PLANE ABOVE THE PIPE BARREL BEFORE EXCAVATING THE TRENCH.

F. ENSURE THAT THE MINIMUM GRADE ON HOUSE CONNECTIONS IS TWO PERCENT UNLESS OTHERWISE SPECIFIED.

4. UNLOADING AND STORAGE OF PIPE AND FITTINGS

A. UNLOAD PIPE, FITTINGS, AND ACCESSORIES WITH HOISTS OR BY SKIDDING. UNDER NO CIRCUMSTANCES ARE PIPES TO BE DROPPED. DO NOT SKID OR ROLL PIPE HANDLED ON SKIDWAYS AGAINST PIPE ALREADY ON THE GROUND. DO NOT DAMAGE CASTING AND LININGS; BUT, IN THE EVENT SHOULD DAMAGE OCCUR, MAKE REPAIRS OR REPLACEMENT TO SATISFACTION OF THE ENGINEER.

B. USE PROPER, SUITABLE TOOLS AND APPLIANCES FOR THE SAFE AND CONVENIENT HANDLING AND LAYING OF THE PIPE AND FITTINGS. TAKE CARE TO PREVENT THE PIPE COATING FROM BEING DAMAGED, PARTICULARLY ON THE INSIDE OF THE PIPE AND FITTINGS.

C. PIPE MAY NOT BE 'STRUNG' ALONG THE JOB WITHIN HIGHWAY RIGHT-OF-WAYS WITHOUT THE APPROVAL OF THE ENGINEER.

D. STORE PIPE ON A FLAT SURFACE SO THE BARREL IS EVENLY SUPPORTED. DO NOT STACK HIGHER THAN 4 FEET (1.3 M). BELLS MUST BE STACKED IN OPPOSING DIRECTIONS ON ALTERNATE ROWS SO THEY ARE NOT SUPPORTING THE FULL LOAD.

E. CAREFULLY EXAMINE ALL PIPE AND FITTINGS FOR DEFECTS JUST BEFORE LAYING AND LAY NO PIPE OR FITTING WHICH IS KNOWN TO BE DEFECTIVE. IN THE EVENT THAT DEFECTIVE PIPE IS DISCOVERED AFTER HAVING BEEN LAID, REMOVE AND REPLACE WITH A SOUND PIPE OR FITTING IN A SATISFACTORY MANNER AT CONTRACTOR'S EXPENSE.

F. THOROUGHLY CLEAN ALL PIPE AND FITTINGS BEFORE BEING LAID. PLUG OPEN ENDS OF PIPE WITH AN APPROVED PLUG DURING CONSTRUCTION.

5. LAY SEWER LINES AS FOLLOWS:

A. THE LENGTH OF TRENCH TO BE OPENED OR THE AREAS OF THE SURFACE TO BE DISTURBED OR UNRESTORED AT ANY ONE TIME SHALL BE LIMITED BY THE ENGINEER WITH REGARD BOTH TO EXPEDITIOUS CONSTRUCTION AND TO THE CONVENIENCE AND COMFORT OF THE PERSONS RESIDING IN THE NEIGHBORHOOD OR FREQUENTING THE STREETS IN QUESTION. NEW TRENCHING WILL NOT BE PERMITTED WHEN EARLIER TRENCHES NEED BACKFILLING OR LABOR IS NEEDED TO RESTORE THE SURFACES OF THE STREETS TO A SAFE AND PROPER CONDITION. IN GENERAL, NO TRENCH SHALL BE OPENED MORE THAN 150 FEET AHEAD OF PIPE LAYING. ALL REQUIRED PERMITS SHALL BE OBTAINED BEFORE TRENCHING BEGINS.

B. LAY SEWER PIPE ACCORDING TO THE LINES AND GRADES ON THE PLANS, OR AS ESTABLISHED BY THE ENGINEER.

C. FORCE MAINS SHALL HAVE A MINIMUM OF 5 FT. (1500 MM) OF COVER, UNLESS OTHERWISE APPROVED BY THE ENGINEER BASED ON FIELD CONDITIONS.

D. THE TOP QUARTER OF THE FORCE MAIN PIPE SHALL BE PAINTED GREEN.

E. ALL PLUG VALVES AND AIR/VACUUM VALVES AND MANHOLES SHALL BE SET ACCURATELY AND CAREFULLY TO THE LINES AND GRADES GIVEN, AND SHALL BE SUITABLE FOR CONNECTION TO THE MAINS.

F. WHERE INDICATED ON THE PLANS, OR DIRECTED, PLUGS, CAPS, TEES, AND BENDS DEFLECTING 22 ½ DEGREES OR MORE SHALL BE PROVIDED WITH RETRAINED JOINT FITTINGS OR TWO INDEPENDENT RESTRAINTS (I.E. MEGALUG PLUS BLOCKING OR MEGALUG PLUS RODDING), AS DETAILED ON THE PLANS. 11 ¼ DEGREE BENDS MAY BE RESTRAINED WITH ONLY ONE METHOD.

G. LAY UNDERGROUND PIPE SO THAT AT LEAST 25 PERCENT OF ITS BARREL CIRCUMFERENCE IS SUPPORTED FOR ITS ENTIRE LENGTH.

H. WHERE INDICATED ON THE PLANS, OR AS DIRECTED BY THE UTILITY ENGINEER, PIPES SHALL BE PLACED ON PIERS OR PILES IN ACCORDANCE WITH THE PLAN DETAILS.

6. JOINTING

A. BEFORE JOINTING, CAREFULLY CLEAN DIRT AND OTHER UNDESIRABLE MATERIAL FROM THE PIPE'S INTERIOR, INCLUDING THE BELL AND THE ANNULAR SPACE.

B. MECHANICAL JOINTS METHOD

WHEN SPECIFIED, INSTALL MECHANICAL JOINTS FOR CAST IRON PIPE.

CAREFULLY FOLLOW THE MANUFACTURER'S INSTRUCTIONS AND HAVE SKILLED WORKERS INSTALL THE JOINT AS FOLLOWS:

1) WASH SOCKETS AND SPIGOTS WITH SOAPY WATER BEFORE SLIPPING GLANDS AND GASKETS OVER SPIGOTS.

2) INSERT THE SPIGOT FULL DEPTH INTO THE SOCKET.

3) BRUSH THE GASKET WITH SOAPY WATER AND PUSH IT INTO POSITION. MAKE SURE THE GASKET IS EVENLY SEATED IN THE SOCKET.

4) SLIDE THE GLAND INTO POSITION FOR COMPRESSING THE GASKET.

5) TIGHTEN THE BOLTS AND NUTS.

A. INITIALLY, TIGHTEN BOLTS AND NUTS FINGER-TIGHT.

B. TIGHTEN BOLTS TO A PERMANENT TIGHTNESS WITH A TORQUE WRENCH.

C. TIGHTEN BOLTS ALTERNATELY 180 DEGREES APART.

6) KEEP SOCKET, SPIGOTS, GLANDS, AND BOLTS CLEAN AND WET WITH SOAPY WATER UNTIL COMPLETING EACH JOINT.

7) REMAKE JOINTS THAT LEAK. ENSURE THAT EACH JOINT MEETS THE LEAKAGE TEST ACCORDING TO NOTE 8 BELOW.

C. PUSH-ON JOINTS METHOD

MAKE PUSH-ON JOINTS IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

D. TRANSITION JOINTS BETWEEN WATER PIPES OF DIFFERENT MATERIALS SHALL BE ACCOMPLISHED BY THE USE OF ADAPTERS MADE ESPECIALLY FOR THAT PURPOSE. SHOP DRAWINGS MUST BE SUBMITTED AND APPROVED BY THE ENGINEER PRIOR TO THE USE OF ANY ADAPTER FOR THIS PURPOSE.

8. LEAK TEST

A. PIPES, FITTINGS, AND APPURTENANCES SHALL BE LAID IN SUCH A MANNER AS TO LEAVE JOINTS WATER-TIGHT. AFTER THE PIPE IS LAID EACH SECTION OF FORCE MAIN, AS THE ENGINEER MAY DETERMINE, SHALL BE PROPERLY AND ADEQUATELY FLUSHED AND THEN TESTED UNDER A HYDROSTATIC PRESSURE OF 150 PSI, AS MEASURED AT THE LOWEST PART ON THE TEST SECTION. WHERE STATIC PRESSURE EXCEEDS 100 PSI, THE TEST PRESSURE AS MEASURED AT THE LOWEST PART ON THE TEST SECTION SHALL BE EQUAL TO THE STATIC PRESSURE PLUS 50 PSI. IF ELEVATION DIFFERENTIALS, WITHIN A TEST SECTION, VARY BY MORE THAN 45 FEET THEN THE SECTION SHALL BE BROKEN INTO A SHORTER LENGTH BY THE INSERTION OF ADDITIONAL VALVES.

B. ALL STUB-OUTS SHALL BE FLUSHED AND INCLUDED IN THE PRESSURE TEST. EACH SHALL BE PROPERLY PLUGGED, BRACED AND TESTED WITH THE STUB-OUT VALVE OPEN. FOLLOWING A SUCCESSFUL PRESSURE TEST, ALL STUB-OUT VALVES SHALL BE LEFT IN THE 'CLOSED' POSITION.

C. TESTS SHALL BE PERFORMED UNDER THE DIRECTION OF THE ENGINEER. THE CONTRACTOR SHALL FURNISH: 1) A PRESSURE GAUGE FOR MEASURING THE PRESSURE ON THE FORCE MAIN; 2) A CORPORATION COCK IN THE MAIN TO ATTACHED GAUGE OR PUMP CONNECTION; 3) PLUGS TO SEAL TAPS AFTER USE IN TESTING; AND 4) A SUITABLE PUMP, PIPE, AND APPLIANCES, LABOR, FUEL, AND OTHER APPURTENANCES NECESSARY TO MAKE THESE TESTS. THE USE OF FIRE HYDRANTS AS CONNECTION POINTS FOR EITHER HYDROSTATIC TESTING IS NOT PERMITTED.

D. EACH SECTION OF PIPE SHALL BE FILLED SLOWLY WITH WATER AND THE SPECIFIED TEST PRESSURE, AS NOTED ABOVE, SHALL BE APPLIED BY MEANS OF A PUMP CONNECTED TO THE PIPE IN A SATISFACTORY MANNER. THE CONTRACTOR WILL PROVIDE ALL MEANS FOR TRANSPORTING OR CONVEYING THE WATER TO THE TEST SECTION.

E. BEFORE APPLYING THE SPECIFIED TEST PRESSURE, ALL AIR SHALL BE EXPELLED FROM THE PIPE. TO ACCOMPLISH THIS, TAPS SHALL BE MADE, AS DIRECTED BY THE ENGINEER, IF NECESSARY, AT POINTS OF HIGHEST ELEVATION, AND AFTERWARD TIGHTLY PLUGGED, ALL, AT THE CONTRACTOR'S EXPENSE.

F. THE TEST PRESSURE SHALL BE MAINTAINED FOR A MINIMUM OF TWO (2) HOURS TO ALLOW FOR THOROUGH EXAMINATION OF LEAKAGE WHERE NECESSARY. THE PIPE LINE SHALL BE MADE WATERTIGHT UNDER THE TEST PRESSURE.

G. NO SEPARATE PAYMENT WILL BE MADE FOR TESTING, BUT THE COST THEREOF SHALL BE INCLUDED IN THE UNIT PRICES BID FOR PIPE INSTALLATION.

H. AFTER THE SECTION OF MAIN HAS BEEN COMPLETELY TESTED, IT SHALL BE PLACED IN SERVICE IMMEDIATELY UPON WRITTEN ORDERS FROM THE ENGINEER. THE CONTRACTOR SHALL SUPPLY ALL LABOR AND EQUIPMENT NECESSARY TO PLACE THE MAIN AND ALL APPURTENANCES IN SERVICE.

PART 4 - MEASUREMENT AND PAYMENT

1. THE OVERALL LENGTH OF FORCE MAIN PIPE OF EACH SIZE INSTALLED SHALL BE MEASURED IN LINEAR FEET ALONG THE CENTRAL AXIS OF THE PIPE DIAMETER.

FORCE MAIN INSTALLATIONS FOR THE VARIOUS SIZES AND TYPES OF PIPE AND FITTINGS, COMPLETE IN PLACE AND ACCEPTED, SHALL BE PAID FOR AT THE CONTRACT PRICE PER LINEAR FOOT TO INCLUDE CLEARING AND GRUBBING (WHERE REQUIRED), EXCAVATION, FURNISHING AND PLACING OF PIPE AND FITTINGS COMPLETE, INCLUDING ALL THRUST RESTRAINTS AND CONCRETE BLOCKING, MAKING ALL REQUIRED CONNECTIONS TO EITHER ACTIVE OR INACTIVE LINES, BACKFILLING, TESTING, SITE RESTORATION AND CLEAN UP, AND THE FURNISHING OF ALL LABOR, MATERIALS, TOOLS, AND APPLIANCES NECESSARY FOR THE PROPER COMPLETION OF THE WORK AS SPECIFIED, INDICATED OR DIRECTED.

THE CONTRACT PRICE FOR EACH FORCE MAIN INSTALLATION SHALL FURTHER INCLUDE FULL COMPENSATION FOR MAINTAINING TRAFFIC, FURNISHING BARRICADES, STEEL TRAFFIC PLATES, WARNING SIGNALS, LIGHTS, FLAGMEN, AND WATCHMEN.

6-INCH DUCTILE IRON SEWER FORCE MAIN SHALL BE MEASURED AND PAID FOR UNDER PAY ITEM 660-0806 TITLED 'SAN. SEWER PIPE, 6", DUCTILE IRON (FORCE MAIN)'.
THE NOTES ON THIS SHEET SHALL SUPERCEDE THE REQUIREMENTS IN SECTION 660 REGARDING THE INSTALLATION AND TESTING OF 6-INCH DUCTILE IRON SEWER FORCE MAIN.

GWINNETT COUNTY DEPARTMENT OF WATER RESOURCES
684 WINDER HIGHWAY
LAWRENCEVILLE, GEORGIA 30045
PHONE: (678) 376-6700

COLUMBIA ENGINEERING
2763 Meadow Church Road, Suite 100
Duluth, Georgia 30097
Phone: (770) 925-0357
Fax: (770) 925-0565

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE:
UTILITY RELOCATION PLANS
FORCE MAIN NOTES
DRAWING No. 44-39